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Measurements of instability waves in a high speed liquid jet ENRIQUE PORTILLO, STEVEN COLLICOTT, GREGORY BLAISDELL, Purdue University — Measurements of instability surface waves present in the near exit region of a high-speed liquid jet are presented. The backlit images, exposed at $1 \mu\text{-sec}$, provide a statistically significant number of measurements so that wavelength and wave velocity can be determined. It is found that the waves stretch as they travel in the downstream direction and that the axial wavelength changes significantly depending on its streamwise location. These results emphasize the importance of stating the axial position of any analytical wavelength resulting from spatial stability analyses. Images also show a strong three dimensional flow, in the form of wave packets, in regions closest to the jet's exit. It is observed that these wave packets merge downstream. Stability analyses suggest the waves are generated by a pocket of absolute instability located at the exit of the jet, and the most dominant mode is determined by the location where the flow transitions to a region of convective instability.

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